DESCRIPTION AND HABITS OF LARVAL *PEDILUS INCONSPICUUS* (HORN) (COLEOPTERA: PEDILIDAE)

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Abstract

Larvae of *Pedilus inconspicuus* (Horn) were collected from decaying acorns and determined from reared adults. They are described and illustrated. The presence of urogomphal pits suggests that the Pedilidae are distinct from the Anthicidae. Phenological data are presented for one local population from central California.

The immatures of Nearctic *Pedilus* species, though recently discussed by Lawrence (1977), have never been formally described. In addition, almost nothing is known of their habits. Mamayev (1976), however, has described the larva of an unidentified Palearctic *Pedilus* from rotting walnut twigs.

Larvae of *Pedilus inconspicuus* (Horn) were found in soil samples near Somerset, in western El Dorado County, California (700 m elevation), and determined from reared adults. Thirty-five penultimate and final instar larvae were collected from late April to early May in 1974 and 1977. The larvae were feeding inside decaying acorns beneath a large black oak (*Quercus kelloggii* Newberry) in an open field. Most were found 5-10 cm below the soil surface. Twenty to 50% of all intact acorns were occupied by *Pedilus* larvae; and density varied from 2-25/0.5m^2 (n = 5).

P. inconspicuus is univoltine. Adults appeared from the first week of April through the first week of June in 1976 and 1977, and 1½ weeks earlier in 1978. Populations peaked in mid-May (1976-1977) and late April (1978). Adult emergence is correlated with the first appearance of leaves and catkins on the black oak. Oviposition possibly takes place in the soil on or near the acorns as very small larvae have been found feeding on the acorns. Acorns dropped in the fall are buried by leaves and worked into the substrate by pocket gophers (*Thomomys bottae*). A portion of the fall crop decays, and is apparently available for feeding in the spring. Larvae have been found only inside decaying acorns ½-2½ years old.

The similar habits of many of the other *Pedilus* adults suggest that their larvae may also be found in decomposing twigs, nuts, and logs on or in the soil.

The following is a composite description based on 5 specimens. Proportions varied slightly between specimens, and were influenced by quality of preservation. Although insufficient material was available for adequate comparison, earlier instars appeared to differ from fully mature larvae only in size, degree of sclerotization, and setal development.

Description. Mature larvae attain lengths of 9 mm; body orthosomatic, subcylindrical anteriorly and cylindrical posteriorly, sides subparallel (Fig. 1). Color off-white to pale creamy yellow; urogomphi, mandibles, and labrum more heavily

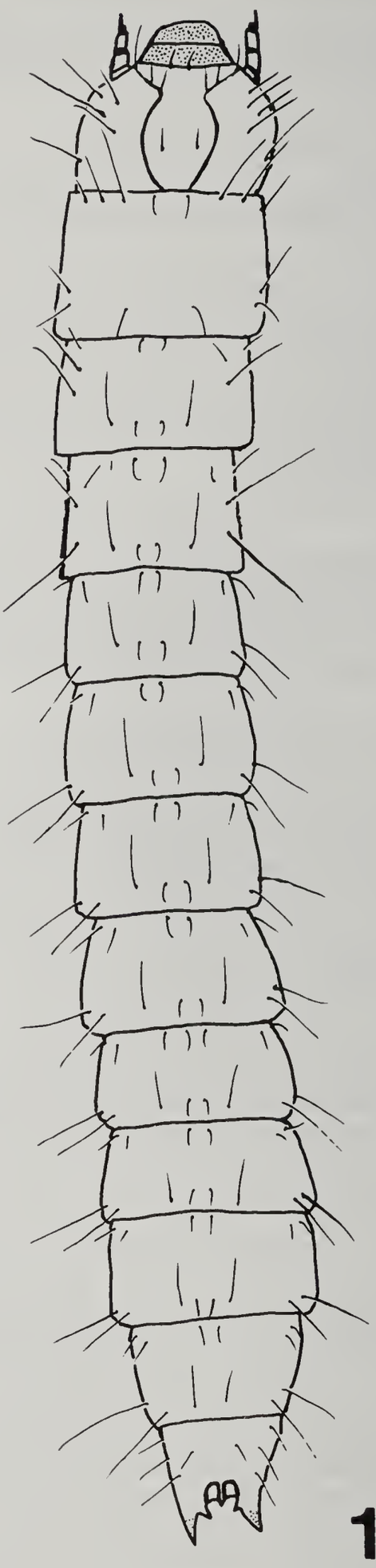

Fig. 1. Mature larva, dorsal view. Length = 9mm.

sclerotized, brown. Relative lengths (along midline) of head to thorax to abdomen roughly 1:2:5. Vestiture sparse, with setae forming weakly defined anterior and posterior rings on thoracic and abdominal segments; 1 dorsal-posterior and 5 lateral-posterior pairs of setae long to very long, remainder short. Thoracic and abdominal tergites with sharp lateral margins.

Head prognathous, exserted, somewhat depressed. Epicranial suture lyre-shaped; stem absent or nearly so, confluent with strongly sclerotized rim of occipital foramen; anterior arms weaker, complete to antennal sockets. Three to 4 stemmata on lateral aspect of head immediately posterad of antennal socket. Antennae prominent, 3-segmented, about 0.6X as long as width of head between antennal insertions (Fig. 2); second segment bearing broad, somewhat bulbous sensory appendage; first 2 segments subequal in length, roughly 1.5X longer than third; second segment 0.7X width of first, 2.5X wider than third; sensory appendage in lateral view slightly more than ½ the length and almost 2X the width of third segment. Clypeus fused with frons. Width of labrum nearly twice its length, nearly rectangular, with broadly rounded antero-lateral margins, surface moderately rugose, with 5 pairs of long setae and 3 pairs of antero-lateral spines. Epipharyngeal region (Fig. 3) with numerous small spines; anterior margin apparently glandular. Mouth parts retracted. Mandibles (Fig. 4) stout, nearly symmetrical; molar region nearly ½ mandible length; 3 strong, conical incisors present apically with a weaker 4th tooth along inner margin. Maxilla (Fig. 5) with cardo weakly divided by diagonal crease, basal section of cardo more weakly sclerotized than distal section, and curving inwards towards labium; stipes more weakly sclerotized than mala, but otherwise not distinctly separated from the latter; mala densely spinose ventrally along distal and oral margins; oral margin with 3 blunt, heavily sclerotized, subapical teeth; distal margin jagged, with shallow cleft; maxillary palpus 3 segmented. Labium (Fig. 6) with ligula short, protruding antero-medially; prementum rectangular, width nearly twice its length, separated from mentum by a weak sulcus; mentum narrowed posteriorly, equal in length to prementum, about ½ length of submentum; submentum long, broadening posteriorly. Gula slightly longer than broad, shorter than submentum. Hypopharyngeal sclerite (Fig. 7) well developed, rectangular, with short anterior arms; posterior arms long, narrow, more weakly sclerotized; anterior aspect of hypopharynx with dorsal ring of setae, the latter most strongly developed on apical and basal lips; ventral surface with a pair of small, median pits.

Thorax with legs well developed, slightly shorter than width of head capsule, segments very sparsely setose and without spines. Cervicosternum divided into 3 plates. Pronotum roughly rectangular, slightly larger than meso- and metanota, these trapezoidal (broadest posteriorly). Mesothoracic spiracles small, broadly elliptical (Fig. 8); remaining thoracic spiracles not discernible.

Abdominal tergites 1-8 subequal in length. Ninth tergite forming a sclerotized ring around tip of abdomen, bearing heavily sclerotized, fixed, bifurcate urogomphi distally (Fig. 9); inner branches small, conical, postero-mesally directed, enveloping 2 large urogomphal pits; outer branches long, almost ½ width of head capsule, strongly up-curved, bearing 3 pairs of setiferous calli laterally and 2 pairs dorsally near urogomphal bases. Urogomphal pits with strongly reinforced margins, pits separated by weak apical tooth. Ninth sternite with a pair of short, sclerotized, basal-lateral spurs. Tenth segment reduced to small ventral pad posteriad of anus. Abdominal spiracles minute, about ½ diameter of mesothoracic spiracles, slightly larger on 1st abdominal segment; annular; 1st abdominal spiracles apparently biforous.

Discussion. The larva of *P. inconspicuus* agrees in most structures with the description and figures of both "*Pedilus* sp." (Mamayev 1976) and *Pergetus campanulatus* (LeConte) (Böving and Craighead 1931, described under *Eurygenius*). The shape and setal patterns on the labrum, antenna, mala, and urogomphal plate appear to be important as species-level discriminants.

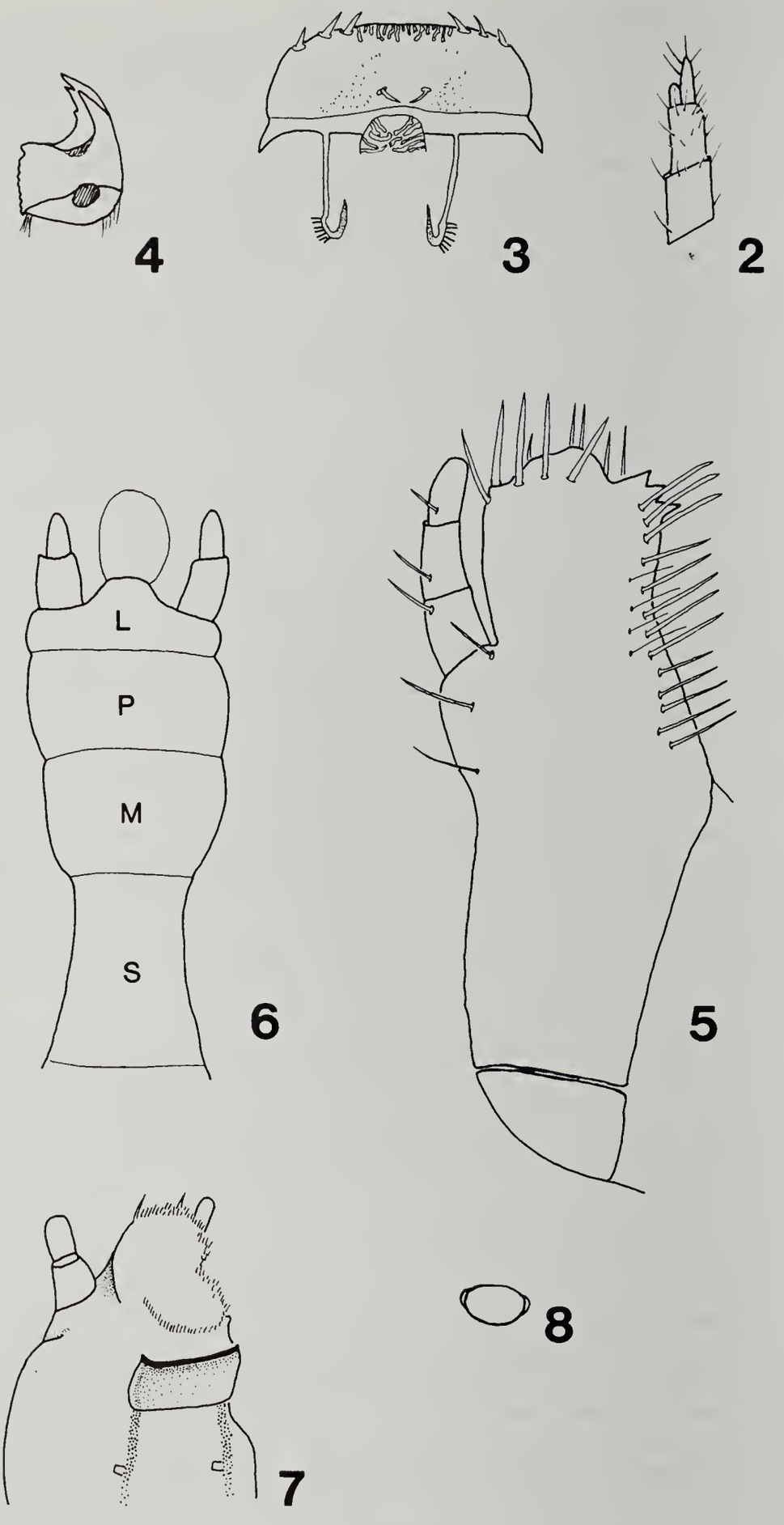

Fig. 2-8. Antenna, epipharynx, mouth parts, and spiracle: 2, left antenna, dorsal view, length = 0.5mm; 3, epipharyngeal region, width = 0.3mm; 4, left mandible, length = 0.4mm; 5, left maxilla, dorsal view, length = 0.7mm; 6, labium, length = 0.6mm, L, ligula, P, prementum, M, mentum, S, submentum; 7, hypopharynx, dorsal view, length = 0.3mm; 8, prothoracic spiracle, maximum diameter = 50μ.

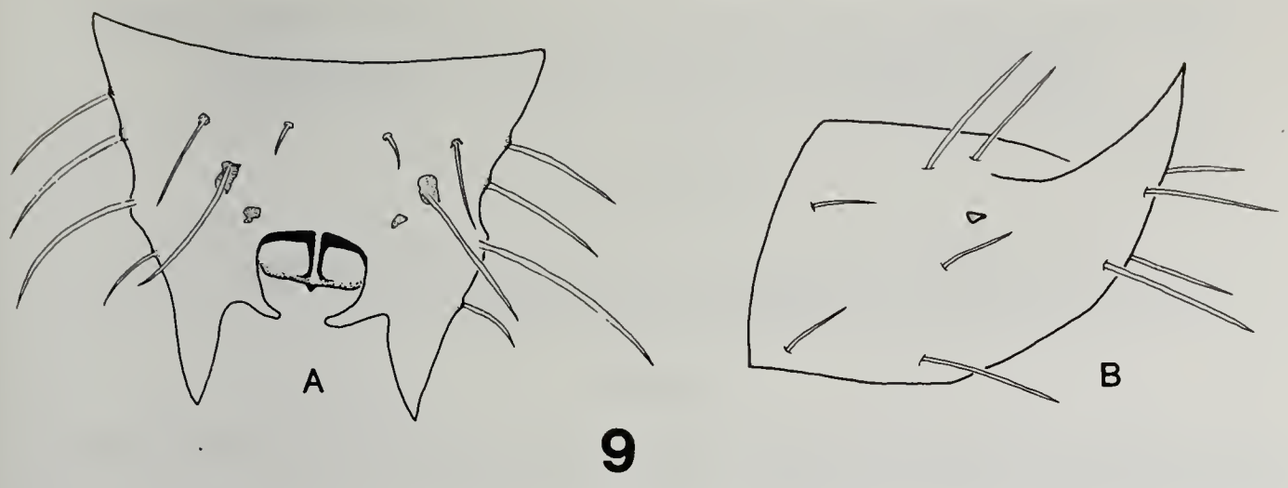

Fig. 9. Urogomphal plate. A, dorsal view; B, lateral view. Length = 0.7mm.

Mamayev (1976) emphasized the importance of the urogomphal pits in relating *Agnathus* to *Pedilus*. The nature of the urogomphal plate, and in particular the urogomphal pits, appears sufficiently different from known anthicid larvae (e. g. Peterson 1951) to suggest that the inclusion of *Pedilus* and related genera within the Anthicidae—as attempted by Crowson (1955) and Abdullah (1969)—is untenable.

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